WEB BASED INVENTORY MANAGEMENT SYSTEM IN LOTTEMART SOLO BARU

Submitted as a Partial Fulfillment of the Requirements for Getting Bachelor Degree

of Informatics Department Faculty of Communication and Informatics

By:

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2019

APPROVAL PAGE

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SCIENTIFIC PUBLICATION

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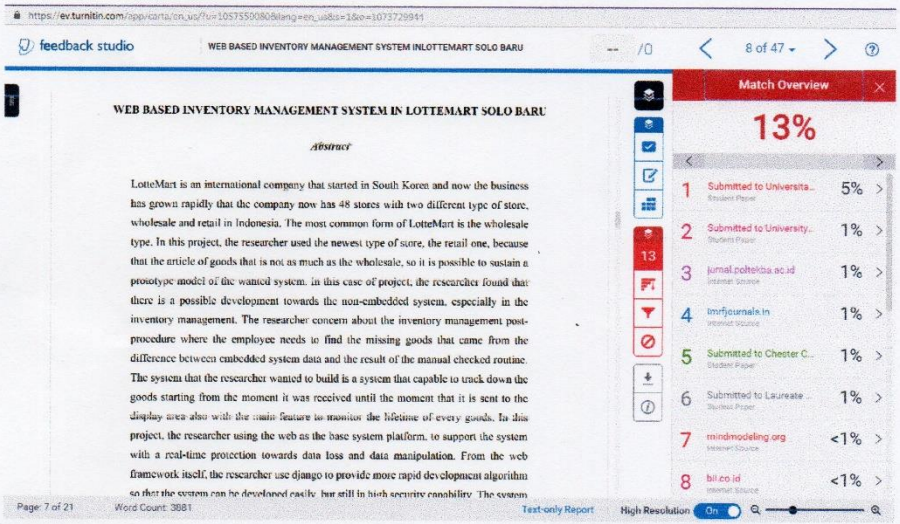

WEB BASED INVENTORY MANAGEMENT SYSTEM IN LOTTEMART SOLO BARU

Abstrak

LotteMart adalah perusahaan internasional yang dimulai di Korea Selatan dan sekarang bisnisnya berkembang pesat sehingga perusahaan ini sekarang memiliki 48 toko dengan dua jenis toko, grosir dan ritel di Indonesia. Bentuk paling umum dari LotteMart adalah tipe grosir. Dalam proyek ini, peneliti menggunakan jenis toko terbaru, yakni ritel, karena barang yang tidak sebanyak grosir, sehingga dimungkinkan untuk mempertahankan model prototipe dari sistem yang diinginkan. Dalam kasus proyek ini, peneliti menemukan bahwa ada kemungkinan pengembangan diluar sistem yang tidak tertanam, terutama dalam manajemen persediaan. Peneliti memperhatikan tentang manajemen pasca-prosedur persediaan di mana karyawan perlu menemukan barang-barang yang hilang yang berasal dari perbedaan antara data sistem tertanam dan hasil manual yang diperiksa secara rutin. Sistem yang ingin dibangun oleh peneliti adalah sistem yang mampu melacak barang mulai dari saat diterima sampai saat dikirim ke area tampilan juga dengan fitur utama untuk memantau masa pakai setiap barang. Dalam proyek ini, peneliti menggunakan web sebagai platform sistem dasar, untuk mendukung sistem dengan perlindungan waktu nyata terhadap kehilangan data dan manipulasi data. Dari kerangka web itu sendiri, peneliti menggunakan Django untuk menyediakan algoritma pengembangan yang lebih cepat sehingga sistem dapat dikembangkan dengan mudah, tetapi masih dalam kemampuan keamanan yang tinggi. Sistem ini bekerja dengan tepat untuk mendukung proses bisnis harian toko dengan 91,2% penerimaan dari karyawan yang terkait dengan sistem.

Kata kunci: inventory management system, django, sistem berbasis web.

Abstract

LotteMart is an international company that started in South Korea and now the business has grown rapidly that the company now has 48 stores with two different type of store, wholesale and retail in Indonesia. The most common form of LotteMart is the wholesale type. In this project, the researcher used the newest type of store, the retail one, because that the article of goods that is not as much as the wholesale, so it is possible to sustain a prototype model of the wanted system. In this case of project, the researcher found that there is a possible development towards the non-embedded system, especially in the inventory management. The researcher concern about the inventory management post-procedure where the employee needs to find the missing goods that came from the difference between embedded system data and the result of the manual checked routine. The system that the researcher wanted to build is a system that capable to track down the goods starting from the moment it was received until the moment that it is sent to the display area also with the main feature to monitor the lifetime of every goods. In this project, the researcher using the web as the base system platform, to support the system with a real-time protection towards data loss and data manipulation. From the web framework itself, the researcher use django to provide more rapid development algorithm so that the system can be developed easily, but still in high security capability. The system works appropriately to supports store daily business process with 91.2% acceptance from the employee that related to the system.

Keywords: inventory management system, django, web based system.

1. INTRODUCTION

LotteMart is an international company that started in South Korea and now the business has grown rapidly that the company now has 48 stores with two different type of store, wholesale and retail in Indonesia. The most common form of LotteMart is the wholesale type, which was named Makro, a Netherland company with wholesale based store. In this project, the researcher used the newest type of store, the retail one, because the amount of article of goods that is not as much as the wholesale, so it is possible to sustain a prototype model of the wanted system. The retail industry here is defined as an industry that sells products and services that have been added value to meet personal, family, group, or end-user needs. Most products sold are fulfillment of household needs, including nine basic ingredients (Soliha, 2008). In this case of project, the researcher found that there is a possible development towards the non-embedded system, especially in the inventory management. The development plan found when the store need to manually check some goods at particular division of categorized goods. This is a regular operation that called as stocktaking, or in definition it is the process of calculation and adjustment of inventory and assets owned by the store or company in the warehouse or storefront with stock data contained in the database system of the company (Wibisono, Noertjahyana, & Handojo, 2013). The procedure itself has its own standard which determined by the higher authority in the company, but the researcher concern about the post-procedure where the employee needs to find the missing goods that came from the difference between system's stock data and the result of the manual checked routine. In this case, the employee must find the missing goods manually, whether to find it in the warehouse, or in the area of selling, or in the shelf, or anywhere possible, while the data administrator try to find any leads from the sales report.

The researcher come up with the idea to make this problem solved with higher efficiency, it was the inventory management system that has the function to track down every goods that received by the store, start from the moment that the goods entering the warehouse to the moment the goods leaving the warehouse. This idea based on the enterprise system of the store.

The system that the researcher wanted to build is a system that capable to track down the goods starting from the moment it was received until the moment that it is sent to the display area as this is the major solution that most warehouse need to solve different stock data amount (Syahruddin, 2016). The system would forcing efficient system as warehouse management system provides less effort, more efficient, and reliable results compared to manual handled system (Atieh et al., 2016), while the warehouse is not supervised by a specific division, the researcher decided to choose the warehouse as the variable to be concerned.

In this project, the researcher using the web as the base system platform, to support the system with a real-time protection towards data loss and data manipulation. From the web language itself, the researcher use django to provide more understandable algorithm so that the system can be developed easily, but still in high security capability.

2. METHOD

In this research, the researcher using the prototyping method to make the proposed system. The reason why the researcher use prototyping is because in this method, the researcher able to communicate with the client or implemented institution, so that the system made already satisfied the classification rapidly based on the need. Prototyping requires more user involvement and allows them to see and interact with a prototype allowing them to provide better and more complete feedback and specifications (Sabale & Dani, 2012). The diagram of prototype method can be seen in the figure 1.

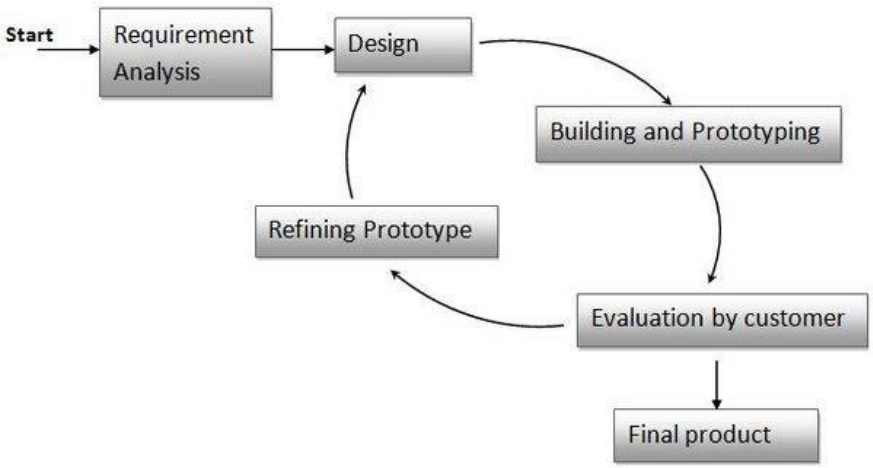

Figure 1. Prototype method

2.1 Requirement Analysis

The analysis began when the researcher was within the organization as an observer to observe the enterprise system of the company store. The researcher was being part of division that handle the administration and logistic data control that support the researcher to have a comprehensive observation towards store back office business process.

Within 30 days, the researcher managed to bring up the result of observation into simple general process as seen in figure 2.

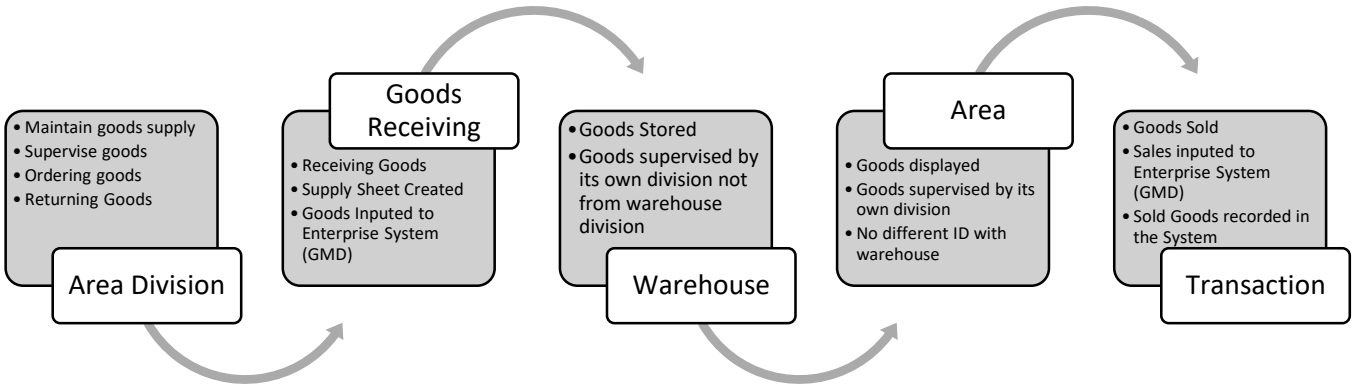

Figure 2. Enterprise system

2.2 Design

This system using web as its base and using django framework of python as the language, the system using web based system to provide company with a more productive and empowered individuals (Goodyear et al., 2010), on in this case is divisions, and the reason this system using python and django framework because it gives a high security and developable programming language so any further development by third parties would be possible to done. As written in his journal, Peirce said that python language is remarkably easy to understand especially to anyone with experience of object oriented programming (Peirce, 2007). Object oriented programming is a good methodologies that combined the data and the process by incorporating one and another into one model, this might support the system to balance between data focused and process focused (Dennis, Wixom, & Tegarden, 2015). To support python language, django is the best framework to fit this language, it is a dynamic object oriented and encourage rapid development and clean, pragmatic design (Plekhanova, Fadem, Miller, Comes, & Kaufman, 2009). The actors in this system can be explained by the following use case regarding their actions as in the figure 3.

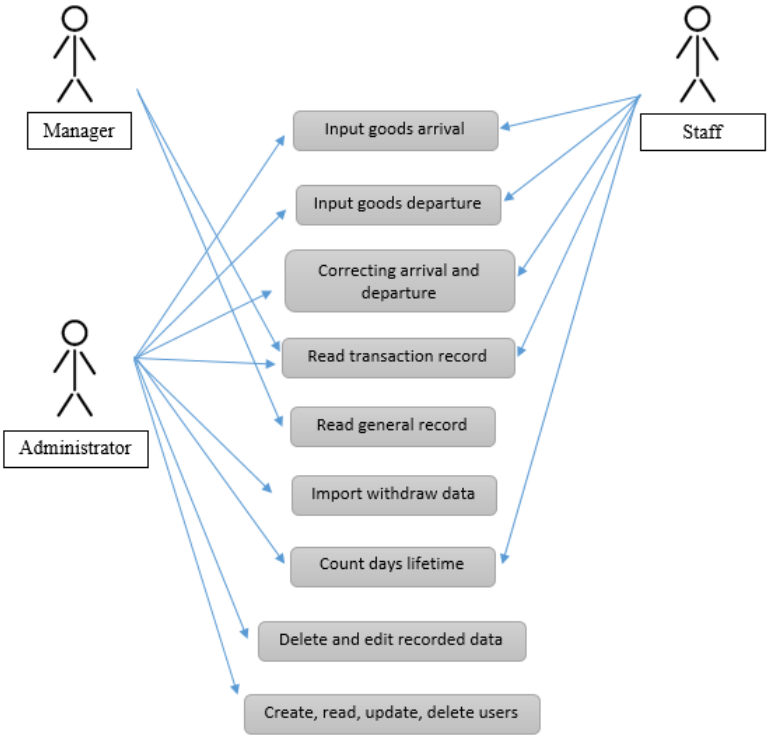

Figure 3. Use case diagram

The manager or the Store General Manager (SGM) could get general report from exported table that is provided by the system, also the manager may view and read the warehouse transaction record whether to see the items location or to watch over the lifetime of the goods.

The staff consist of the area staff and goods receiving (GR) staff which operate the goods movement and involved in the goods lifetime changes. They can input and edit the recorded data into the system, and also there is a delete button to move the record to another table, they can also read the warehouse transaction record and run the count days function to get every goods lifetime.

The administrator is the ALC (Administration and Logistic Control) division which handle the whole system workflow, they can create, read, update, and delete the user data and account. They also can permanently delete the recorded data, and run all functionality that the staff can do too.

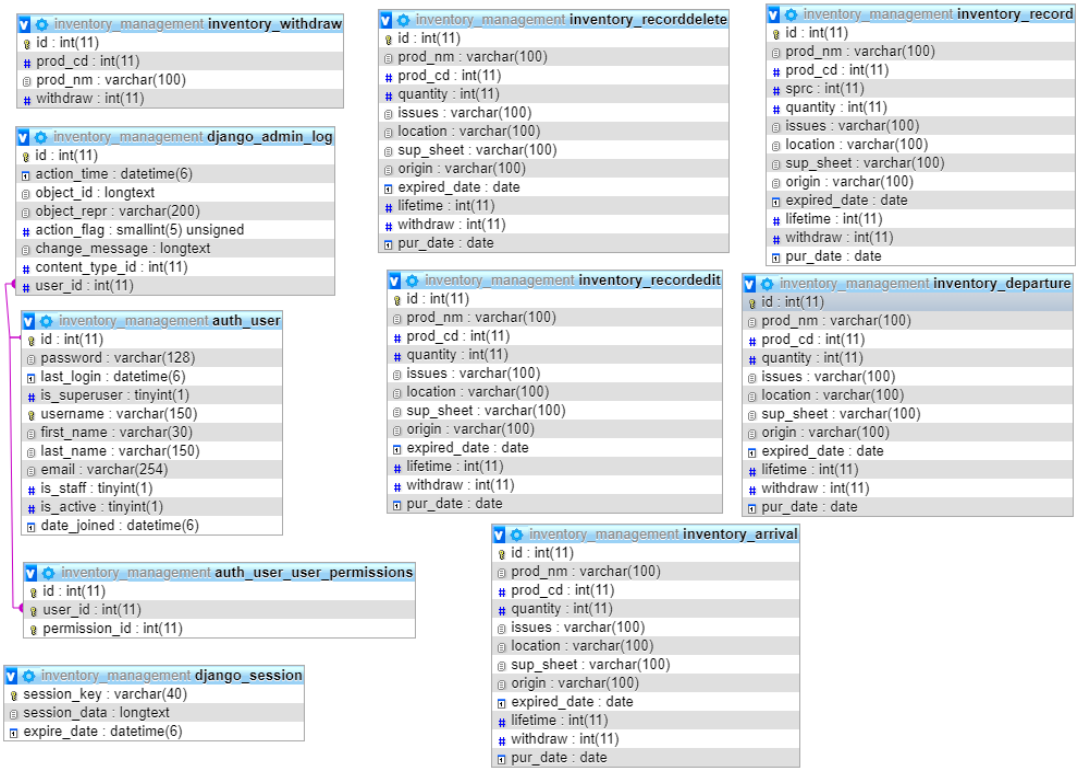

Figure 4. Database tables structure

For the database, they are divided into two database, based on its origin and related functionality. The first one is the administration database, this database handle the administration documentation and information. In this database, it stored all information about the users, groups, permissions, and session. The other database is the operational database, this database handle the front-end feature which this database store all the information regarding the main functionality of the system, there are inventory_arrival, inventory_departure, inventory_record, inventory_recordedit, and inventory_recorddelete. In this database, there are no foreign key, but inventory_arrival and inventory_departure has trigger function to trigger whenever insert, update, and delete action done.

The activity diagram as shown on the figure 5, shows the main action that can be done by the main actors that mentioned in the use case diagram. The activity diagram shows the process from the log in until the record status captured and displayed in the system. From the diagram we can see that the main activities are runs by the staff, which has authorities to create, read, update, and delete the arrival and departure table, but only edit on item records. For deleting item records, only authorized to the administrator, also for the deleted and edited record, only authorized to the administrator to edit and delete any rows.

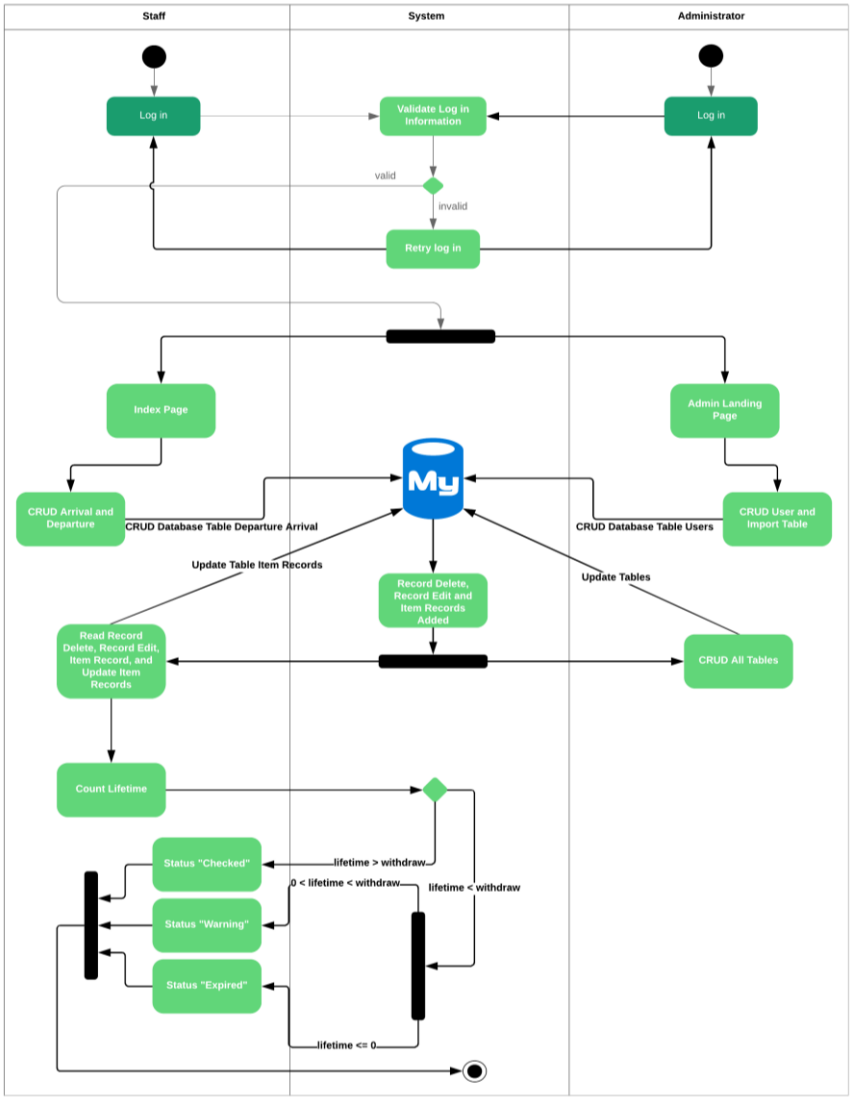

Figure 5. Activity diagram

2.3 Tools

The tools that were being used to build the system are shown in the table 1:

Table 1. Software tools

Number	Tools Name	Specification	Amount
1	Windows OS	Windows 10 (64-bit)	1
2	Xampp	v.3.2.2	1
3	Python	v.3.6.7	1
4	Django	v.2.1.5	1
5	Sublime Text	Build 3103	1
6	Microsoft Excel	Version 2013	1
7	Dummy Data	Dummy data sample	20 rows
8	Google Chrome Browser	Version 71.0.3578.98 (Official Build) (64-bit)	1

The researcher use sublime text to write script and sql query before launched to the server side. The main programming language that the researcher use are HTML and Python to create the web. The browser that was being used to test and display the web is google chrome. For import and export data, the researcher used Microsoft excel. Xampp was being used to create the environment for local hosting.

3. RESULT AND DISCUSSION

This system has 10 functions, counted by the buttons that are used to run specific functionality within system features. Some of the functions are done in the user processing, and other functions are done in the server calculation and processing. Basically there are 2 landing pages, the first one is the admin, and the second one is the index. The admin page handle the administration processing feature, and the index handle the operational processing features.

3.1 User Interface

User Interface is an important part of a system that would determine the level of perception that the users have during the interaction between system and the user. As described in his thesis, user interface is important to avoid misleading of the system function that might affect the user to re-understanding the system over and over (Sanders, 2018). For the admin page, the system works on the management of users, permissions, and the table connection to the database. For index page, there are 10 buttons that has its own functionality which important for the system activity. Login page as shown in the figure 6, is the login functionality that works only on the administration page to make sure the user would get authorization to access the admin feature and index page. The landing page shows the main feature of administration page, authentication and authorization feature, and inventory tables that handle the system operational as shown in the figure 7. In the figure 8, 9, and 10, every operational table has an import and export functionality that allows the user to import the data through the admin page, in this process, the import bypassing the index page and directly stores the data into the databases. For import feature, the admin page would retrieve any imported data that formatted in xlsx, xls, csv, tsv, json, and yaml. The file should be chosen before submitted and match the format. The export feature allows the user to export any rows that stored in the database and exported into some format that provided by the admin page, there are xlsx, xls, csv, tsv, ods, json, yaml, and html. The data will be formatted automatically as the format that has been chosen. For the figure 11, this page manage the users that are registered in the system, also manage the adding procedure of user. This page allows the superuser or the admin to create, read, update, and delete the user.

In the figure 12, it shows the index landing page, the main site for operational system. For the figure 13, it shows the add arrival form, the form to adding row to the table of arrival. Figure 14 shows the display functionality to show the list of row in the table, for figure 15 is the edit form for the specific row that shown in the table which has option to edit or delete. The edited row will be inserted or updated to the inventory_recordedit table, which shown in the figure 16, and the deleted row will be moved to the inventory_recorddelete table as shown in the figure 17. All the listed rows from table inventory_arrival and table inventory_departure will be shown also in the inventory_record table as shown in the figure 18, and all of these table that shown in the index page, can be exported as a report with some option, whether to print as shown in the figure 19 or to download to csv or excel or pdf as shown in the figure 20.

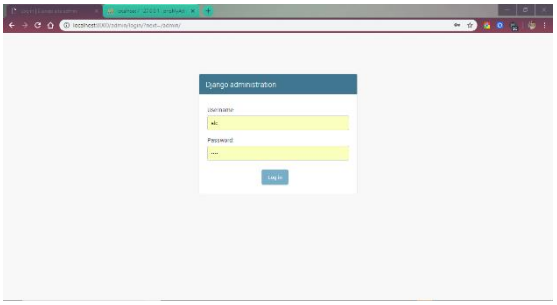

Figure 6. Login page

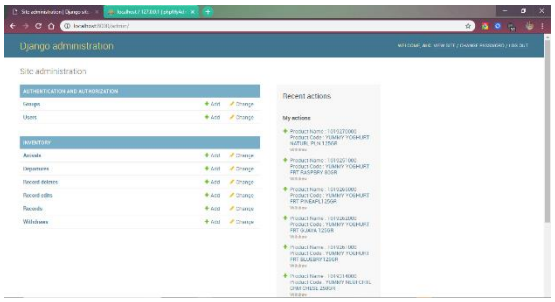

Figure 7. Admin landing page

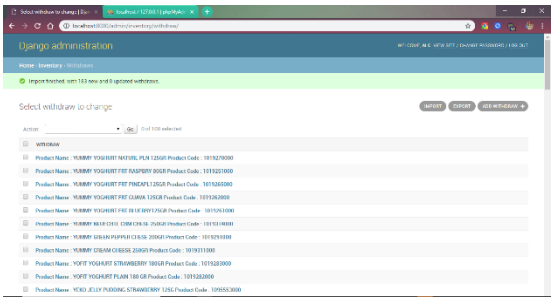

Figure 8. Import export via admin

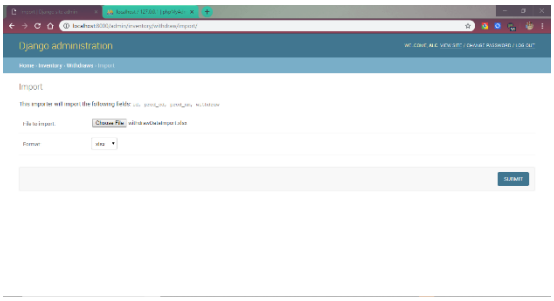

Figure 9. Import row via admin

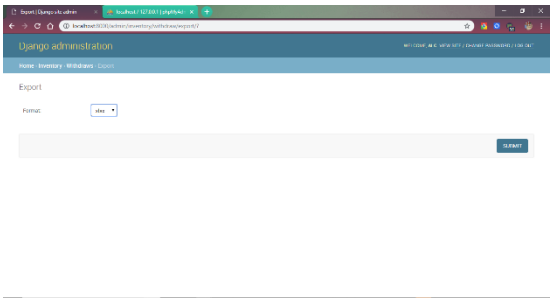

Figure 10. Export via admin

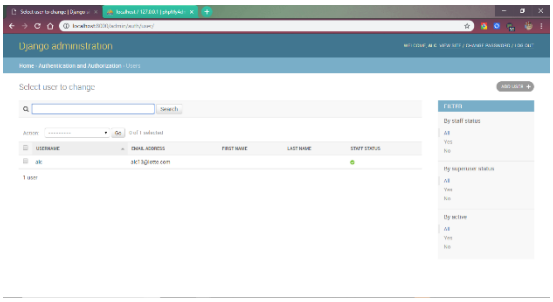

Figure 11. User CRUD

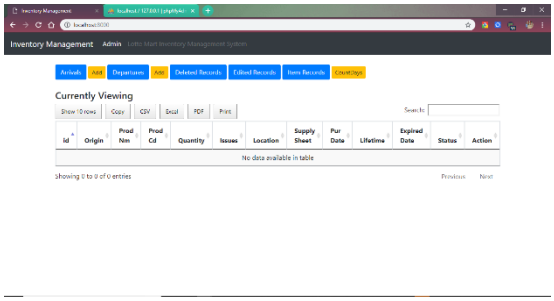

Figure 12. Index landing page

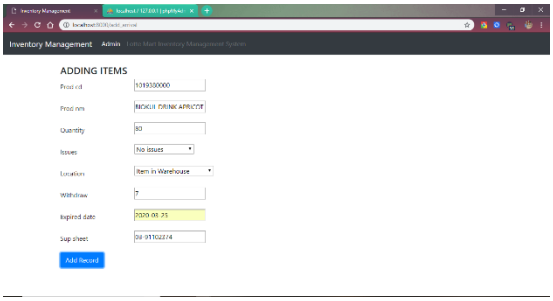

Figure 13. Add arrival record

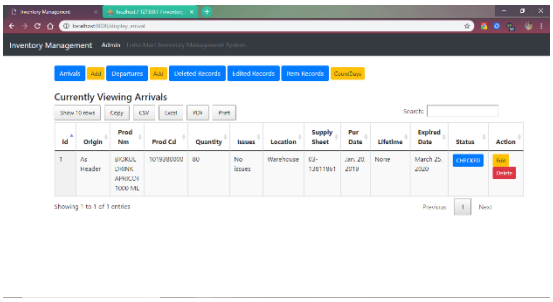

Figure 14. Display arrival record

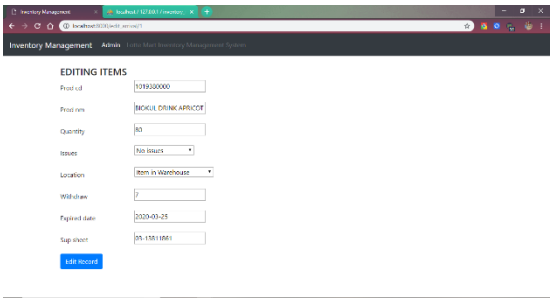

Figure 15. Edit record

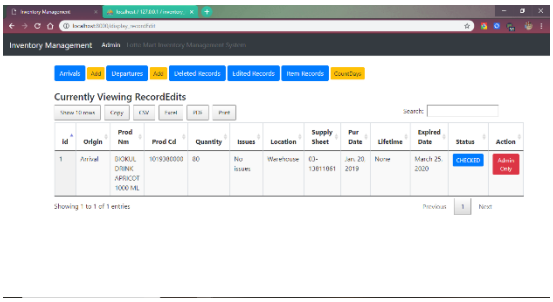

Figure 16. Edited record

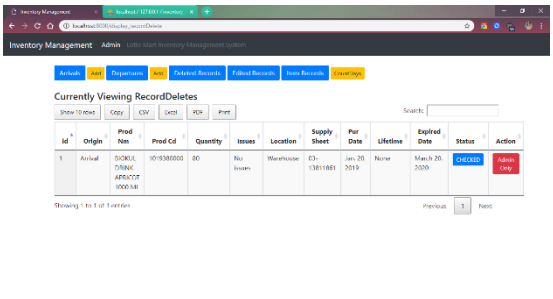

Figure 17. Deleted record

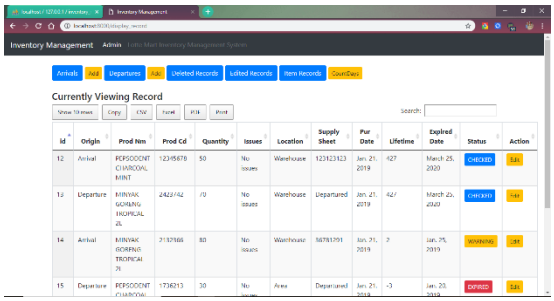

Figure 18. Item records

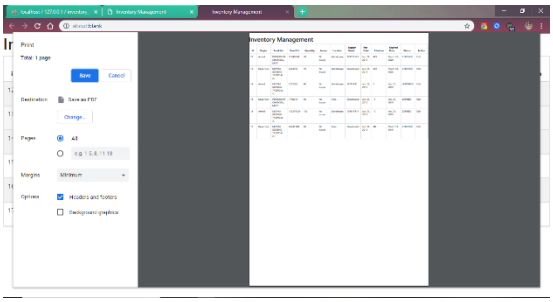

Figure 19. Export to print

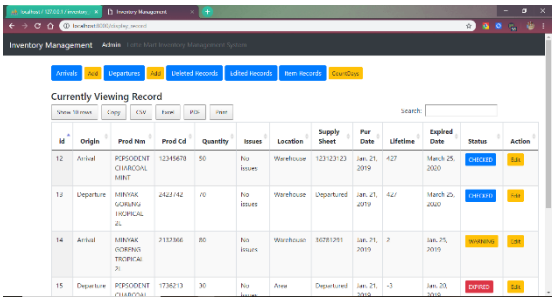

Figure 20. Export to download

3.2 Blackbox Testing

Blackbox testing is a sequence of test that runs to check whether all the functionality within the system has working properly and meet the expectation. The result if the blackbox testing can be seen in the table 2.

Table 2. Blackbox testing

Num	Object	Test	Input	Output	Result
1.	Admin Page	Log in	Input username and password	Admin landing page	Valid
2.		Add User	Add user button	Add user page	Valid
3.		Add User Confirmation	New user Information	New user added	Valid
4.		Edit and Delete User	Change or delete action button	User edited or deleted	Valid
5.		Models Import	Button import	Models data imported	Valid
6.		Open Site	Button view site	Index landing page	Valid
7.		Log out	Button log out	User logged out	Valid
8.	Index Page	Landing Page	Click text “Inventory Management”	Index landing page	Valid
9.		Arrival Record Display	Button display arrival	Arrival record rows	Valid
10.		Departure record display	Button display departure	Departure record rows	Valid
11.		Edited record display	Button record edited	Edited record rows	Valid
12.		Deleted record display	Button record deleted	Deleted record rows	Valid
13.		All record display	Button items record	All record rows	Valid
14.		Add arrival row	Button add after arrival	Add arrival form	Valid
15.		Add departure row	Button add after departure	Add departure form	Valid
16.		Edit arrival row	Button edit on row	Edit arrival form	Valid
17.		Edit departure row	Button edit on row	Edit departure form	Valid
18.		Delete arrival row	Button delete on row	Row deleted	Valid
19.		Delete departure row	Button delete on row	Row deleted	Valid
20.		Recording edit	Edit on row	Edited row captured	Valid
21.		Recording delete	Delete on row	Deleted row captured	Valid
22.		Lifetime count	Button count days	Lifetime counted and displayed	Valid
23.		Change to admin page	Click text “Admin”	Admin landing page	Valid

From the table 2 it can be conclude that the system has been working properly and meet the expectation of the system input and output, either from the admin page and the landing page. This test shows that the correlation between two pages and the related functionality has been connected and synchronized through various functions.

3.3 User Acceptance

In this user acceptance testing, the result was taken from the questionnaire that was given to the company by choosing some sample of the employee. The chosen employees were selected by the relevancy to the system, as this system would not use for public, therefore the questionnaires only

given to the employee that works in the LotteMart Solo Baru. The statements that were given to the tester are about the interface, the user ease of use, the functionality, the benefit, and the company needs.

From the table 3, it shows that the user acceptance toward the system is high, as the average percentage that given from five statements is 91.2%. This index shows how the employees are having a positive experiences during the system testing, and also shows that the employees didn't meet any problems during the testing.

As shown in the figure 21 which shows the result chart form the table 3 that depict the high index of SS and S which state the acceptance from the user is high, also shown in the figure 22, that the interpretation of each statement is more than 75%, or on the average of 91.2% of interpretation of every statement to check the user acceptance toward the system.

Table 3. Questionnaire result

Number	Statement	Answer Value					Total Value	Percentage
		SS(5)	S(4)	C(3)	TS(2)	STS(1)		
1	P1	0	4	1	0	0	19	76%
2	P2	4	1	0	0	0	24	96%
3	P3	4	1	0	0	0	24	96%
4	P4	4	1	0	0	0	24	96%
5	P5	4	0	1	0	0	23	92%
Average Percentage								**91.2%**

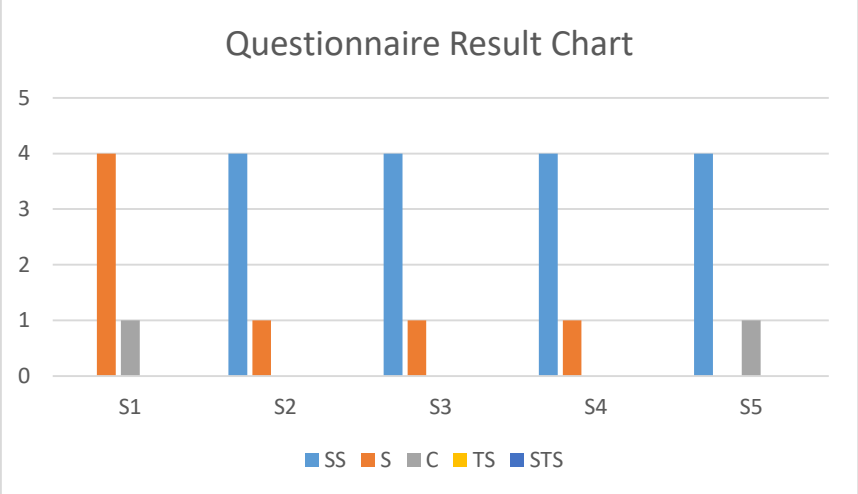

Figure 21. Questionnaire result chart

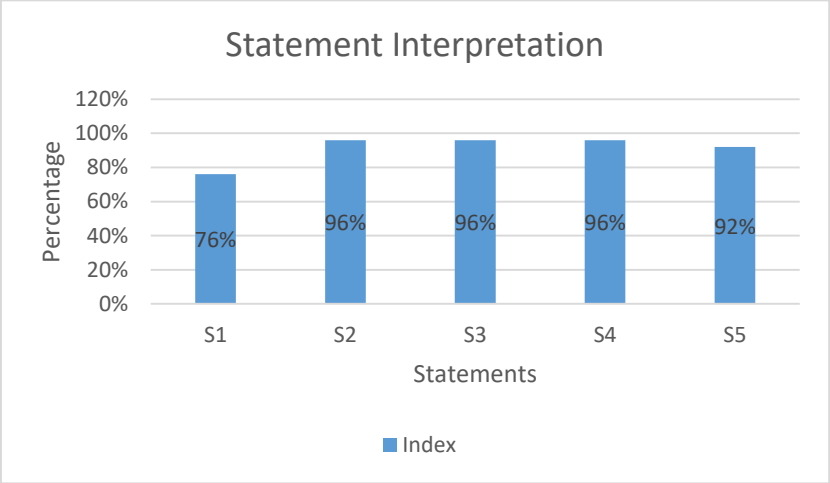

Figure 22. Statement interpretation

Table 4. Question list

Question		Legend	
1. Fitur yang disediakan berjalan dengan baik 2. Fitur mudah dipahami dan digunakan 3. Tampilan menarik dan mudah dipahami 4. Sistem bermanfaat bagi pengguna dan toko 5. Sistem mampu memenuhi kebutuhan pengguna dan toko	1. Provided features are working well 2. Features are easy to understand and use 3. The user interface is good and understandable 4. System is beneficial for the user and store 5. System is capable to fulfil the need of user and store	SS : Sangat Setuju S : Setuju C : Cukup TS : Tidak Setuju STS : Sangat Tidak Setuju	SA : Strongly Agree A : Agree N : Neutral D : Disagree SD : Strongly Disagree

Based on the questionnaire result in table 3, it shows that the interface has meet the user expectation which they found that the system is understandable with 96% of index, also for the feature understanding and user, the users found it easy to understand the feature, with given text on the buttons and the table of system interfaces. For the functionality, the system has meet the company need with 92% index, also for the functionality process the users found it working well and helpful for the company business process with 76% index. For the benefit, most users are strongly agree with the statement that this system is beneficial for the employees and the company with 96% acceptance. Overall the system acceptance index is at 91.2% which shows high acceptance from the users.

4. CLOSING

Inventory Management System for LotteMart Solo Baru has been made and working properly, also already meet the expectation for the functionality. From the system testing by the users, this system is beneficial with 96% indication that the system is beneficial for the company and the users or the employee. In this system there are several development that can be done, either the functionality or the interface and may be performed in the future, as this system is fulfilling the user expectation with 91.2%, it can be raised more by the development of features and interfaces.

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